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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/422,528	10/21/1999	WOON-LAM Susan LEUNG	P1190R1	5652

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EXAMINER	
FRONDA, CHRISTIAN L	
ART UNIT	**PAPER NUMBER**
1652	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/422,528	LEUNG ET AL.	
	Examiner	Art Unit	
	CHRISTIAN L. FRONDA	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 15-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 October 1999* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-13 and 15-25 are under consideration in this Office Action.

2. The rejections of claims 1-13 and 15-25 under 35 U.S.C. 112, second paragraph, as being indefinite has been withdrawn in view of applicants' amendment and arguments filed 12/12/2007.

Claim Rejections - 35 U.S.C. § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-13 and 15-24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hart et al. (BIO/TECHNOLOGY Vol 12, November 1994; PTO 1449 dated 03/06/2000) in view of the combined teachings of Wetzel et al. (EP 0155189; PTO 1449 dated 03/06/2000) and Van Dien et al. (Appl Environ Microbiol. 1997 May;63(5):1689-95; PTO 892). The reference teachings and rejection of record have been reproduced below.

Hart et al. teach a process for large scale production of IGF-I from the periplasm of *E.coli* comprising culturing *E.coli* host cell having a plasmid comprising an inducible alkaline phosphatase promoter and nucleic acid encoding a human IGF-I linked to a *lamB* signal sequence for secretion into the periplasm to (see entire publication, especially pp. 1113-115).

Wetzel et al. teach a plasmid vector comprising an inducible promoter and nucleic acid encoding a T4 phage lysozyme (see entire publication, especially pp.3-7 and claims1-9).

Van Dien et al. teach genes involved in polyphosphate metabolism in Escherichia coli were cloned behind different inducible promoters on separate plasmids. The gene coding for polyphosphate kinase was placed behind the P_{tac} promoter and its expression induced by the addition of IPTG. The gene coding for polyphosphatase was placed behind the P_{BAD} promoter and its expression induced by the addition of arabinose (see entire publication, especially RESULTS and DISCUSSION and pp. 1689-1693).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to place the nucleic acid encoding a T4 phage lysozyme taught by Wetzel el al. behind the arabinose inducible P_{BAD} promoter and/or place the nucleic acid encoding a human IGF-I linked to a *lamB* signal sequence for secretion into the periplasm taught by Hart et al. behind the

IPTG inducible P_{tac} promoter. It would have been obvious to one of ordinary skill in the art to further transform the *E.coli* host cells taught by Hart et al. with the modified plasmid vector of Wetzel et al. and/or the modified plasmid vector having the nucleic acid encoding a human IGF-I linked to a *lamB* signal sequence placed behind the IPTG inducible P_{tac} promoter. It would have been obvious to one of ordinary skill in the art at the time the invention was made to culture the modified *E.coli* host cells, induce expression of human IGF-I by addition of IPTG where the expressed IGF-I is secreted into the periplasm, induce expression of T4 phage lysozyme by addition of arabinose after 50% or more of the human IGF-I has accumulated, the modified *E.coli* host cells are mechanically disrupted to release the IGF-I from the periplasm, and the IGF-I is recovered in the presence of EDTA.

One of ordinary skill in the art at the time the invention was made would have been motivated to do this in order to have synthesis of lysozyme that ruptures the polysaccharide membrane of the *E.coli* host cell after accumulation of human IGF-I in the periplasm which simplifies the purification of the human IGF-I. One of ordinary skill in the art at the time the invention was made would have been motivated to wait until 50% or more of the human IGF-I has accumulated before inducing with arabinose to express T4 phage lysozyme in order to obtain a greater yield of human IGF-I. Furthermore, it would have been obvious to one of ordinary skill in the art to construct a vector having the nucleic acid encoding the T4 lysozyme and nucleic acid encoding human IGF-I on the same vector for the purposes of having a only a single vector which simplifies transformation in the *E.coli* host cell.

The art of recombinant heterologous protein expression in bacterial host cells is well developed and widely used in biotechnology for obtaining a desired protein. Thus, one of ordinary skill in the art at the time the invention was made would have a reasonable expectation of success in that any desired protein can be produced by the modified method described above.

The reference of Dennis et al. (WO 93/24633. Published 12/09/1993) cited in the IDS dated 06/19/2000 teaches a recombinant *E.coli* host cell comprising a plasmid containing a biosynthetic pathway coding for poly-β-hydroxybutyrate and a plasmid containing a lysozyme gene, and a process for the production an recovery of poly-β-hydroxybutyrate by culturing said recombinant *E.coli* host cell (see entire reference). The reference shows that lysozyme was important in the purification and recovery process of the product from the bacterial cell (see Examples 1-8). Thus, one of ordinary skill in the art ordinary skill in the art at the time the invention was made would be motivated to eliminate or reduce proteoglycan and polysaccharide components of the *E.coli* bacterial cell wall such that the *E.coli* host cell taught by Hart et al. is modified as described above. Elimination or reduction of proteoglycan and polysaccharide components of the *E.coli* bacterial cell wall by action of the expressed lysozyme would enable a simpler purification of IGF-I or of any desired protein.

Thus, the claimed invention was within the ordinary skill in the art to make and use at the time was made, and was as a whole clearly *prima facie* obvious.

The arguments filed 12/12/2007 have been fully considered but are not persuasive to for reasons of record as supplemented below. It must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the

applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Furthermore, according to MPEP 2143:

> "Exemplary rationales that may support a conclusion of obviousness include:
>
> (A) Combining prior art elements according to known methods to yield predictable results;
>
> (B) Simple substitution of one known element for another to obtain predictable results;
>
> (C) Use of known technique to improve similar devices (methods, or products) in the same way;
>
> (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
>
> (E) " Obvious to try " – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
>
> (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
>
> (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.
>
> Note that the list of rationales provided is not intended to be an all-inclusive list. Other rationales to support a conclusion of obviousness may be relied upon by Office personnel."

Therefore, in view of the above considerations one of ordinary skill in the art at the time the invention was made would have been motivated to wait until 50% or more of the human IGF-I has accumulated before inducing with arabinose to express T4 phage lysozyme in order to obtain a greater yield of human IGF-I. Furthermore, it would have been obvious to one of ordinary skill in the art to construct a vector having the nucleic acid encoding the T4 lysozyme and nucleic acid encoding human IGF-I on the same vector for the purposes of having a only a single vector which simplifies transformation in the *E.coli* host cell

5. Claim 25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hart et al. in view of the combined teachings of Wetzel et al. and Van Dien et al. as applied to the claims above, and further in view of Balbas et al. (Gene. 1996 Jun 12;172(1):65-9; PTO 892 reference of record). The reference teachings and rejection are reproduced below. The arguments filed 12/12/207 have been considered but are not persuasive to overcome the rejection of record for the reasons stated above.

Balbas et al. teach the plasmid pBRINT which is an efficient vector for chromosomal integration of cloned DNA into the lacZ gene of *Escherichia coli*, method for integrating cloned DNA into the *E.coli* chromosome using said plasmid pBRINT, and that integration of cloned DNA into the chromosome of the host organism is advantageous with respect to stability or undesired copy number effects (see entire publication).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the modified method of Hart et al. such that the nucleic acid encoding the human IGF-I is cloned into the plasmid pBRINT taught by Balbas et al. which in turn is integrated into the *E.coli* chromosome. One of ordinary skill in the art at the time the invention was made would have been motivated to do this to obtain stability of the nucleic acid encoding the human IGF-I and avoidance of undesired plasmid copy number effects as taught by Balbas et al. Thus, the claimed invention was within the ordinary skill in the art to make and use at the time was made, and was as a whole clearly *prima facie* obvious.

Conclusion

6. No claim is allowed.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian L Fronda whose telephone number is (571)272-0929. The examiner can normally be reached Monday-Thursday and alternate Fridays between 9:00AM - 5:00PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nashaat Nashed can be reached on (571)272-0934. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000. CLF

/Tekchand Saidha/
Primary Examiner, Art Unit 1652